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CP-201201490
TXX-12196

Ref. # 10CFR50.73

December 19, 2012

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT (CPNPP)
DOCKET NO. 50-445
UNIT 1 MANUAL REACTOR TRIP DUE TO REACTOR COOLANT
PUMP LOW OIL LEVEL
LICENSEE EVENT REPORT 445/12-003-00

Dear Sir or Madam:

Pursuant to 10CFR50.73(a)(2)(iv)(A), Luminant Generation Company LLC (Luminant Power) hereby submits enclosed Licensee Event Report (LER) 445/12-003-00, "Unit 1 Manual Reactor Trip Due To Reactor Coolant Pump Low Oil Level" for Comanche Peak Nuclear Power Plant (CPNPP) Unit 1.

This communication contains no licensing basis commitments regarding CPNPP Units 1 and 2.

Should you have any questions, please contact Gary Merka at (254) 897-6613.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: 
Fred W. Madden
Director, Oversight & Regulatory Affairs

IE22
NRK

Enclosure

c - E. E. Collins, Region IV
B. K. Singal, NRR
Resident Inspectors, Comanche Peak

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (10-2010)				APPROVED BY OMB NO. 3150-0104 EXPIRES 10/31/2013																																										
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)																																														
1. FACILITY NAME COMANCHE PEAK NUCLEAR POWER PLANT				2. DOCKET NUMBER 05000445		3. PAGE 1 OF 4																																								
4. TITLE UNIT 1 MANUAL REACTOR TRIP DUE TO REACTOR COOLANT PUMP LOW OIL LEVEL																																														
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE		8. OTHER FACILITIES INVOLVED																																						
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9. OPERATING MODE <div style="text-align: center; font-size: 24px;">1</div>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) <table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td>Specify in Abstract below or in NRC Form 366A</td> </tr> </table>								<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A
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10. POWER LEVEL <div style="text-align: center; font-size: 24px;">100</div>																																														
12. LICENSEE CONTACT FOR THIS LER																																														
FACILITY NAME Timothy A. Hope, Manager Nuclear Licensing						TELEPHONE NUMBER (Include Area Code) 254-897-6370																																								
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																														
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX																																					
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)																																														
<p>On November 2, 2012, Comanche Peak Nuclear Power Plant (CPNPP) Unit 1 was in Mode 1 operating at 100 percent power. At 0142 hours, the Unit 1 reactor was manually tripped due to rising Reactor Coolant Pump (RCP) 1-04 motor lower radial bearing temperature and a bearing oil level alarm. All control rods fully inserted, both Motor Driven Auxiliary Feedwater Pumps were manually started, and the Turbine Driven Auxiliary Feedwater Pump automatically started as a result of the reactor trip. The RCP 1-04 motor experienced a lower radial bearing failure which required a Unit 1 manual reactor trip. The lower radial bearing failure was caused by overheating due to loss of oil in the oil reservoir. The loss of oil was due to slow leakage from a degraded elastomeric coupling within the RCP internal oil supply system. The oil supply coupling connection degraded sufficiently to allow the reservoir level to decrease and prevent adequate lower radial bearing lubrication. The seal degraded because a preventative maintenance (PM) activity had not been created or implemented to periodically change these sub-components. Immediate corrective actions included replacement of the RCP 1-04 lower radial bearing and cooling line coupling, seals, and gaskets, and changing the setpoint on the oil level alarm to account for dynamic oil levels within the lower reservoir which will assure a more timely alarm. As a part of the CPNPP Corrective Action Program, PMs will be developed and implemented to evaluate and replace perishable "soft" subcomponents to ensure that those subcomponents will perform their design function throughout their service life and do not adversely affect equipment operation.</p> <p>All times in this report are approximate and Central Time unless noted otherwise.</p>																																														

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
COMANCHE PEAK	05000445	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 4
		2012	- 003	- 00	

NARRATIVE

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

10CFR50.73(a)(2)(iv)(A), Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section including:

10CFR50.73(a)(2)(iv)(B)(1), Reactor protection system including: reactor scram or reactor trip

10CFR50.73(a)(2)(iv)(B)(6), PWR auxiliary or emergency feedwater system

B. PLANT CONDITION PRIOR TO EVENT

On November 2, 2012, Comanche Peak Nuclear Power Plant (CPNPP) Unit 1 was in Mode 1 operating at 100 percent power.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no structures, systems, or components that were inoperable at the start of the event that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On November 2, 2012, CPNPP Unit 1 was in Mode 1 operating at 100 percent power. At 0048 hours, Operators (Utility, Licensed) in the Unit 1 Control Room received a Reactor Coolant Pump (RCP) 1-04 motor [EIS:(AB)(P)(MO)] bearing oil level alarm on the plant computer. The temperature indication was approximately 184 degrees and fluctuating between 180 and 186 degrees. At 0138 hours, Operators received an RCP 1-04 lower radial bearing high-high temperature alarm (approximately 195 degrees and rising). At 0139 hours, Operators received a RCP 1-04 bearing oil level alarm. At 0142 hours, the Unit 1 reactor was manually tripped and RCP 1-04 was secured due to rising RCP 1-04 motor bearing temperature and a bearing oil level alarm. All control rods fully inserted, and both Motor Driven Auxiliary Feedwater Pumps were manually started and the Turbine Driven Auxiliary Feedwater Pump automatically started as a result of the reactor trip. Steam dump valve response was erratic while on the plant trip controller due to a circuit card failure. The card was replaced and satisfactorily retested. The 1-01 atmospheric relief valve opened and closed for a very short period shortly after the trip. Chemistry personnel verified that Steam Generator activity was less than the minimum detectable activity.

E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL PERSONNEL ERROR

Operators (Utility, Licensed) in the Unit 1 Control Room received alarms indicating high RCP 1-04 motor lower radial bearing temperature and low reservoir oil level.

II. COMPONENT OR SYSTEM FAILURES

A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The RCP 1-04 motor experienced a lower radial bearing failure which required a Unit 1 manual reactor trip. The lower radial bearing failure was caused by overheating due to loss of oil in the oil reservoir. The loss of oil was due to slow leakage from a degraded elastomeric coupling within the RCP internal oil supply system. The oil supply coupling connection degraded sufficiently to allow the reservoir level to decrease and prevent adequate lower radial bearing lubrication. The seal degraded because a preventative maintenance (PM)

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activity had not been created or implemented to periodically change these sub-components.

B. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

The RCP 1-04 lower radial bearing was wiped.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

Not applicable - there were no component or system failures associated with this event.

D. FAILED COMPONENT INFORMATION

The motor lower radial bearing consists of seven radial guide bearing shoes positioned by jack screws and held in place by keeper plates. The lower guide bearing assembly is located in the lower oil pot which also contains an integral oil-to-water cooler. The babbitted bearing is 50 percent submerged in oil which is cooled by Component Cooling Water via the oil cooler. The spherical inside diameter of the housing mates with a surface on the bearing cartridge that is overlaid with a cobalt based alloy. Carbon-graphite rings are shrunk in the bearing cartridge and form the bearing surface. The journal, which is shrunk on the shaft, is made of stainless steel overlaid with a cobalt-based alloy.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Both Motor Driven Auxiliary Feedwater Pumps were manually started and the Turbine Driven Auxiliary Feedwater Pump automatically started as a result of the reactor trip.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable - No safety system trains were inoperable during this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

This event is bounded by the CPNPP Final Safety Analysis Report (FSAR) accident analysis which assumes conservative initial conditions which bound the plant operating range and other assumptions which reduce the capability of safety systems to mitigate the consequences of the transient. This event is bounded by the analysis of the partial loss of coolant flow accident presented in Section 15.3.1 of the CPNPP FSAR. The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and to demonstrate core protection margins. The event of November 2, 2012, occurred at 100 percent reactor power, and all safety systems functioned as designed. Based on the above, it is concluded that the health and safety of the public were unaffected by this condition and this event has been evaluated to not meet the definition of a safety system functional failure per 10CFR50.73(a)(2)(v).

IV. CAUSE OF THE EVENT

The RCP 1-04 motor experienced a lower radial bearing failure which required a Unit 1 manual reactor trip. The lower radial bearing failure was caused by overheating due to loss of oil in the oil reservoir. The loss of oil was due to slow leakage from a degraded elastomeric coupling within the RCP internal oil supply system. The oil supply coupling connection degraded sufficiently to allow the reservoir level to decrease and prevent adequate lower radial bearing lubrication. The seal degraded because a preventative maintenance (PM) activity had not been created or implemented to periodically change these sub-components.

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In addition, the bearing oil level alarm, which is designed to annunciate low or high oil level, came in later than expected due to a design issue with the stationary set point versus dynamic conditions within the reservoir resulting in the oil level indicating higher than actual level on the bearing. When the Unit 1 RCPs are started, indicated level in the motor lower radial bearing oil sight glass increases by as much as 7/8 inch. That dynamic level increase artificially biases the high/low alarm system upwards, resulting in the system alarming at an oil level approximately 7/8 inch lower than designed.

V. CORRECTIVE ACTIONS

Immediate corrective actions included replacement of the RCP 1-04 lower radial bearing and cooling line coupling, seals and gaskets. The setpoint on the RCP 1-04 oil level alarm was also changed to provide an earlier response. An uncoupled RCP 1-04 motor run with fluorescent dye in the oil and an ultraviolet light inspection was conducted to ensure adequate sealing of the new parts.

As a result of this event, RCP motor oil usage was evaluated. The RCP 1-04 motor was determined to have had an increasing trend for oil usage. However, abnormal oil usage trends were not observed on the other Unit 1 and Unit 2 RCP motors.

As a part of the CPNPP Corrective Action Program, PMs will be developed and implemented to evaluate and replace perishable "soft" subcomponents to ensure that those subcomponents will perform their design function throughout their service life and do not adversely affect equipment operation. Additionally, the level alarms for the other RCPs will be modified to account for dynamic affects, the elastomers in the other RCPs will be replaced, procedures related to oil addition will be changed, and oil usage trending will be enhanced.

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar reportable events at CPNPP in the last three years.